

Claims

1. A physiological sensing device comprising:  
an electrical sensor dimensioned for insertion into  
5 the tissue of a live animal with minimal disruption to  
the tissue and configured to measure electrically at  
least one physiological parameter of the tissue, such as  
the partial pressure of carbon dioxide, the partial  
pressure of oxygen, temperature, pH or glucose  
10 concentration;  
an electrical cable for communicating signals from  
the sensor and connected electrically at its distal end  
to the sensor; and  
a sheath mechanically connected to the sensor and  
15 extending with and surrounding at least a portion of the  
length of the cable,  
wherein the sheath comprises a plurality of  
substantially longitudinally extending flexible portions  
separated by a plurality of longitudinal slits, such  
20 that movement of the proximal end of the sheath towards  
the distal end of the sheath shortens the distance  
between the ends of the flexible portions and causes the  
flexible portions to project outwardly and thereby  
increase the effective diameter of the sheath in the  
25 region of the flexible portions, such that the sensor  
can be retained in animal tissue by the projecting  
flexible portions.
2. A device as claimed in claim 1 further comprising a  
30 line mechanically connected to the distal end of the  
sheath and extending longitudinally with the cable for  
assisting in pulling the distal end of the sheath  
towards the proximal end thereof.
- 35 3. A device as claimed in claim 1 or 2, wherein the  
cable is surrounded only by the sheath.

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4. A device as claimed in any preceding claim having a maximum diameter, with the flexible portions flush with the sheath, of 2 mm, preferably 1 mm.
5. A device as claimed in any preceding claim, wherein the sensor is a sensor for the partial pressure of carbon dioxide ( $p\text{CO}_2$ ) and comprises two spaced electrodes in a chamber containing water, the chamber being bounded at least partially by a carbon dioxide permeable membrane.
6. A device as claimed in claim 5, wherein the sheath forms the carbon dioxide permeable membrane.
7. A physiological sensing device comprising:  
a sensor for the partial pressure of carbon dioxide ( $p\text{CO}_2$ ) having two spaced electrodes in a chamber containing water, the chamber being bounded at least partially by a carbon dioxide permeable membrane;  
an electrical cable connected electrically at its distal end to the electrodes; and  
a sheath extending with and surrounding at least a portion of the length of the cable,  
wherein the sheath forms the carbon dioxide permeable membrane.
8. A device as claimed in any preceding claim comprising a plurality of sensors for respective physiological parameters.
9. A device as claimed in any preceding claim comprising a temperature sensor.
10. A physiological sensing device comprising:  
an electrical sensor dimensioned for insertion into the tissue of a live animal with minimal disruption to the tissue and configured to measure electrically at

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least one physiological parameter of the tissue, such as the partial pressure of carbon dioxide, the partial pressure of oxygen, temperature, pH or glucose concentration;

5       a signal processing device connected to the electrical sensor and arranged to process signals from the electrical sensor to generate a measurement of the physiological parameter; and

10       a reference electrode for electrical connection to a patient,

      wherein the reference electrode is connected to the signal processing device and the signal processing device is configured to compensate the electrical signals from the electrical sensor for electromagnetic noise from the patient by reference to signals from the reference electrode.

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11. A physiological sensor comprising:

      a sensor body having a longitudinal axis;

20       at least two electrodes spaced in a direction transverse to the longitudinal axis of the sensor body;

      a plurality of support members extending outwardly from the axis of the sensor body and defining between adjacent support members at least one liquid channel

25       that provides a fluid pathway between the electrodes; and

      a gas-permeable, liquid-impermeable membrane supported by the support members and providing an outer wall of the liquid channel(s).

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12. A sensor as claimed in claim 11, wherein the electrodes extend longitudinally.

13. A sensor as claimed in claim 11 or 12, wherein the liquid channel(s) are transverse to the longitudinal axis of the sensor body.

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14. A sensor as claimed in any of claims 11 to 13,  
wherein the support members are transverse to the  
longitudinal axis of the sensor body.
- 5 15. A sensor as claimed in any of claims 11 to 14,  
wherein the support members are formed integrally with  
the sensor body.
- 10 16. A sensor as claimed in any of claims 11 to 15,  
wherein the electrodes are located in a recess in the  
sensor body that has a greater cross-sectional area than  
the liquid channels.
- 15 17. A method of manufacturing a physiological sensor  
comprising a sensor body having defined therein a water-  
filled chamber closed by a semi-permeable membrane, the  
method comprising :  
    immersing the sensor body in water; and  
    attaching the membrane to the sensor body to close  
20 the chamber while the sensor body is in the water.